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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application Of: Slatter *et al.*

Group No.:

Serial No.:

Docket No. 30004064-2

Filed: Feb 19, 2002

For: **Wearable Transmitting/Receiving Device**



**CLAIM OF PRIORITY TO AND
SUBMISSION OF CERTIFIED COPY OF UNITED KINGDOM APPLICATION
PURSUANT TO 35 U.S.C. §119**

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

In regard to the above-identified pending patent application and in accordance with 35 U.S.C. §119, Applicant hereby claims priority to and the benefit of the filing date of United Kingdom patent application entitled, "Wearable Transmitting/Receiving Device", filed March 28, 2001, and assigned serial number 0107798.1. Further pursuant to 35 U.S.C. §119, enclosed is a certified copy of the United Kingdom patent application

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER
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By:

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I hereby certify that this correspondence is being deposited with the United States Postal Service as "Express Mail Post Office to Addressee" in an envelope addressed to: Commissioner of Patents and Trademarks, Box: Patent Application, Washington, D.C. 20231, on

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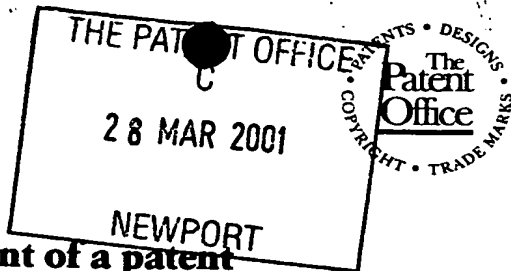


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1. Your reference

30004064 GB

2. Patent application number

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28 MAR 2001

0107798.1

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Hewlett-Packard Company
3000 Hanover Street
Palo Alto
CA 94304, USA

496588001

Patents ADP number (if you know it)

Delaware, USA

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention Wearable Transmitting/Receiving Device

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Richard A. Lawrence
Hewlett-Packard Ltd, IP Section
Filton Road
Stoke Gifford
Bristol BS34 8QZ

7448038001

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

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Description

Claim(s)

Abstract

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9

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1

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

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Fee Sheet

11.

I/We request the grant of a patent on the basis of this application.

Signature

Richard A. Lawrence

Date

28/3/01

12. Name and daytime telephone number of person to contact in the United Kingdom

Meg Joyce Tel: 0117-312-9068

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WEARABLE TRANSMITTING/RECEIVING DEVICE

This invention relates to a wearable receiving/transmitting device.

5

Portable cameras have been available for a reasonable length of time. The cameras are intended to be worn on a user's clothing in a covert form.

10 Disadvantages arise with this type of device because the unit is still too large and too heavy to comfortably sit on a wearer's clothing. They are also obtrusive and unsightly.

15 Also, there are available cameras and other electronics disguised as a part of eye glasses, but these presently require bulky eye wear, which many users are unwilling to wear, especially users who do not ordinarily wear glasses.

20 It is an object of the present invention to address the above mentioned disadvantages.

According to a first aspect of the present invention a wearable transmitter/receiver comprises a front portion
25 and a rear portion, wherein the front portion includes a transmission/reception section and is adapted to be worn outside a wearer's clothing, and wherein the rear portion includes a control section and is adapted to be worn inside at least part of the wearer's clothing, in which
30 the front and rear portions are operable to communicate electrically with one another.

The transmitter/receiver may be either a transmitter or a receiver, or may be both a transmitter and a receiver.

5 The transmitter/receiver may be a wearable electromagnetic (EM) radiation transmitter/receiver.

The front portion may include an infra red (IR) transmitter. The front portion may include a radio transmitter or a visible light transmitter or an
10 ultrasound transmitter.

The control section of the rear portion may control the transmission/reception section.

15 The control section may be programmable.

The front portion may include image capture means, which means are preferably a camera lens and an electronic light sensitive element, such as a charge coupled device (CCD).

20 The image capture means may be operable to capture moving and/or still images.

The control section of the rear portion may include control means for the image capture means, which may
25 include automatic gain adjustment means. Alternatively automatic gain adjustment means may be located in the front portion. The rear portion may also include storage means for storage of captured images, said storage means may be a memory section.

30

The front and rear portions may be electrically connected by means of an electronically conducting connection pin, which is preferably arranged to extend through a wearer's

clothing between the front and rear portions. The pin preferably projects from the rear portion to be received in a corresponding opening in the front portion.

- 5 The electrically conducting connection pin may have multiple conduction paths, to pass power and data between the front and rear portions for example.

10 The front and rear portions may alternatively be inductively coupled. In which case the front and rear portions may be held in proximity to one another magnetically.

The front portion may be disguised, preferably as a piece
15 of jewellery, such as a brooch or badge. When so disguised the jewellery may be configured as an antenna.

The transmitter/receiver may have a plurality of different front portions all being differently shaped, preferably to
20 blend with, or be suitable with, a wearer's clothing and all being operable to be used with the same rear portion.

According to a second aspect of the present invention a wearable transmitter/receiver comprises a front portion
25 and a rear portion, wherein the rear portion is a control section and the front portion is one of a plurality of interchangeable transmission/reception sections adapted to be secured to the rear portion and to communicate electrically therewith, wherein the front portion is
30 disguised to suit a wearer's clothing.

The front portion may be disguised to be less visible against clothing, or may be disguised as a decorative feature.

- 5 All of the features disclosed herein may be combined with any of the above aspects in any combination.

Specific embodiments of the present invention will now be described, by way of example, and with reference to the
10 accompanying drawings, in which:

Figure 1 is a schematic cross sectional side view of a miniature camera disguised in a piece of jewellery having an electronic portion of the camera secured behind a
15 wearer's clothing; and

Figure 2 is a schematic cross-sectional side view of a camera disguised in jewellery inductively coupled to a rear control portion.

20

A camera 10 is disguised to resemble a piece of jewellery 30 or integrated with common fashion accessories such as a tie clip. The jewellery includes a lens section 28 and antenna 31. An electronic portion of the camera 10 is
25 positioned in an electronics module 26 behind the user's clothing 27, while the jewellery 30 clips to the front of the user's clothing 27. A pin 29 penetrates the user's clothing 27, fixes the jewellery 30 in place, and electrically mates the two parts together. This
30 construction works particularly well because for most efficient operation the lens section 28 needs to be located on the outside of a user's clothing 27.

The electronics module 26 may contain a "Blue tooth" (a high frequency broadcast standard) transmission module, with the jewellery 30 including the antenna 31 operable to transmit signals to a Blue tooth standard which can
5 transmit signals over a short distance, e.g. from the camera 10 to a receiver module 19 elsewhere on a user's body or in a bag carried by the user. The signals received by the receiver module 19 could then be stored or transmitted further to a network remote from the user. In
10 this way a bulkier storage device could be located in the receiver module 19 where it is more easily carried. Also a bulkier transmitter for transmission to a remote receiver could also more easily be stored in the receiver module 19.

15 Many different types and shapes, sizes and colours of jewellery 30 can be envisaged in order to best achieve an unobtrusive camera 10 which can be worn by a user with a variety of clothing. The jewellery 30 may be similar to a
20 badge, and/or may be of type more suitable or more likely to be worn by man.

The jewellery 30 may carry a photovoltaic cell 33 to provide power for the camera 10, which power may be stored
25 in a power supply 26b in the electronics module 26.

The electronics module 26 also includes a semiconductor memory 26a for electronic storage of images captured by the camera lens section 28, as well the power supply 26b
30 for the camera and control circuitry 26c for the camera.

The pin 29 forms an electrical connection to allow receipt of the electrical signals corresponding to a picture from

the camera lens section 28 and also to send power from the electronics module 26 to the camera lens section 28.

5 The pin 29 may have multiple conduction paths, such as a path for power and a path for data. There may be multiple paths for different types of data and a further path for power.

10 The multiple paths may be provided by a plurality of separate pins, or by concentric ring-shaped connections, as used in an audio socket for example.

15 Image capture is achieved in this example by a CMOS sensor 28a which is part of the lens section 28 on the outside of the user's clothing 27. Electrical signals corresponding to the captured picture generated by the CMOS 28a sensor are then transmitted through the pin 29 to the storage section 26a in the electronics module 26.

20 The lens section 28 is designed with a wide angle lens and a high resolution CMOS sensor 28a. The resolution is sufficient such that the image quality is not significantly impaired when the final image consists of an area cropped from the full wide angle image.

25 The electronics module 26 also includes circuitry 26d for controlling the gain setting of the CMOS sensor 28a to achieve a desired picture quality. The circuitry for controlling the gain settings may alternatively be located
30 in the camera lens section 28.

The camera lens section 28 and associated electronics may also be used to capture moving images, as well as still

images, which can also be stored in the electronics module 26.

Image capture may be triggered at set intervals of time or
5 by dynamic events, such as laughter or gestures detected
by the lens section 28.

When used for moving images the motion of a user wearing
the jewellery based camera on their clothing may cause
10 problems for stabilisation of the image captured. A wide
variety of image stabilisation programs are known and are
used in relation to handheld video cameras. It is
believed that suitable amendment of this type of image
stabilising software will achieve a stabilised image for
15 use with the camera described above.

The electronics module 26 could be relatively thin and
wide to spread the weight over a larger area, thereby
reducing the depth and so the risk of injury caused by the
20 internal part being forced against the body.

The antenna 31 or another transmitter type could be
configured to send information to or from a personal
digital assistant (PDA) and onto or from another device,
25 such as a printer for printing or PC for transferring
other data. This would ensure that the PDA need not be
pointed so accurately at the device, because the
transmission from the antenna 31 would be broader than the
directional IR beam of a PDA. The PDA may also be stored
30 in a user's pocket or bag and have a wire or radio link to
the camera 10 and its antenna 31 to allow reception by the
antenna 31, with data etc being passed to the PDA.

If transmitting radio frequencies, the antenna could be internal, e.g. in the electronics module 26.

The reason for having the possibility of replaceable heads for jewellery is to allow for concealment of the camera lens section 28 or transmitter. Also heads could be replaced to change functions, i.e. to change from a stills camera to a video camera or the like.

10 Another possibility for connecting the jewellery or front piece to the rear electronics module 26 would be to have inductive coupling between the front and rear portions, see Figure 2. With this method existing methods of transmitting power and data between the front and rear
15 portions could be used. Electrical signals could be passed through the garment from the front portion to the electronics module 26. The benefit of such an arrangement would be that no piercing of the clothing 27 is required.

20 Although a camera 10 is shown in the Figure 1 arrangement, other embodiments can relate to other wearable transmitters or receivers. One possibility is an infrared emitting tag or badge, used for example to identify the wearer. Such an IR transmitter, emitting (for example) a
25 coded IR signal, can be used to identify a subject appearing in photographs - this arrangement is described in the applicant's copending British patent application of even date entitled "Automatic Image Capture".

30 The invention described herein in the different embodiments shown advantageously solves the problem of having a discrete wearable (EM) transmitter/receiver which can be unobtrusively worn on a wearer's clothing. By

providing separation between the parts which must be on the exterior of a wearer's clothing (such as a camera head) and the electronics which can be behind a user's clothing, the device as described can be worn discretely and carried much more comfortably.

The invention is not restricted to the embodiments described above.

CLAIMS:

1. A wearable transmitter/receiver comprises a front
5 portion and a rear portion, wherein the front portion
includes a transmission/reception section and is adapted
to be worn outside a wearer's clothing, and wherein the
rear portion includes a control section and is adapted to
be worn inside at least part of the wearer's clothing, in
10 which the front and rear portions are operable to
communicate electrically with one another.
2. A wearable transmitter/receiver as claimed in claim 1,
which is a wearable electromagnetic (EM) radiation
15 transmitter/receiver.
3. A wearable transmitter/receiver as claimed in either
claim 1 or claim 2, in which the front portion includes a
radio transmitter.
4. A wearable transmitter/receiver as claimed in any one
of the preceding claims, in which the control section of
the rear portion controls the transmission/reception
section.
5. A wearable transmitter/receiver as claimed in any
preceding claim, in which the front portion includes image
capture means.
6. A wearable transmitter/receiver as claimed in claim 5,
in which the rear portion includes control means for the
image capture means.

7. A wearable transmitter/receiver as claimed in either claim 5 or claim 6, in which the rear portion also includes storage means for storage of captured images.

8. A wearable transmitter/receiver as claimed in any preceding claim, in which the front and rear portions are electrically connected by means of an electrically conducting connection pin.

9. A wearable transmitter/receiver as claimed in claim 8, in which the electrically conducting connection pin is arranged to extend through a wearer's clothing between the front and rear portions.

10. A wearable transmitter/receiver as claimed in either claim 8 or claim 9, in which the electrically conducting connection pin projects from the rear portion to be received in a corresponding opening in the front portion.

11. A wearable transmitter/receiver as claimed in any one of claims 8 to 10, in which the electrically conducting connection pin has multiple conduction paths.

12. A wearable transmitter/receiver as claimed in any one of claims 8 to 11 which includes a plurality of electrically conducting connection pins arranged to connect the front and rear portions.

13. A wearable transmitter/receiver as claimed in any preceding claim, in which the front portion is disguised as a piece of jewellery, such as a brooch or badge.

14. A wearable transmitter/receiver as claimed in any preceding claim, in which the transmitter/receiver has a plurality of different front portions all being differently shaped to blend with, or be suitable with, a wearer's clothing and all being operable to be used with the same rear portion.

15. A wearable transmitter/receiver comprises a front portion and a rear portion, wherein the rear portion is a control section and the front portion is one of a plurality of interchangeable transmission/reception
5 sections adapted to be secured to the rear portion and to communicate electrically therewith, wherein the front portion is disguised to suit a wearer's clothing.

16. A wearable transmitter/receiver as claimed in claim
10 15, in which the front portion is disguised to be less visible against clothing.

17. A wearable transmitter/receiver as claimed in claim 15
15 or claim 16, in which the front portion is disguised as a decorative feature.

18. A wearable transmitter/receiver substantially as described herein with reference to the accompanying drawings.

ABSTRACT
WEARABLE TRANSMITTING/RECEIVING DEVICE

A wearable camera arranged to be worn on a user's clothing
5 comprises a lens section 28 which is disguised in a piece
of jewellery 30. The piece of jewellery is connected to a
rear electronics portion 26 by means of an electrically
conducting pin 29. The rear electronics portion 26 houses
control means including a semi-conductor memory 26a, power
10 supply 26b, control circuitry 26c and circuitry 26d for
controlling the gain setting of a CMOS sensor 28a in the
lens section 28.

(Figure 1)

